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Indian Standard
DIMENSIONS FOR CONNECTIONS FOR AIRCRAFT GROUND ELECTRICAL SUPPLIES

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DIMENSIONS FOR CONNECTIONS FOR AIRCRAFT GROUND ELECTRICAL SUPPLIES

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Indian Standard

DIMENSIONS FOR CONNECTIONS FOR AIRCRAFT GROUND ELECTRICAL SUPPLIES

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 6 September 1976, after the draft finalized by the Aircraft Electrical Equipment Sectional Committee had been approved by the Electrotechnical Division Council.

0.2 During the recent years there has been increasing demand of electrical equipment for use in aircrafts. To provide the necessary guidance regarding technical knowhow and other requirements, such as minimum performance requirements consistent with optimum quality and uniform test methods, urgent need has been felt for standardization in this field.

0.3 This standard is based on ISO/R 461-1965 'Connections for aircraft ground electrical supplies', issued by the International Organization for Standardization (ISO). Assistance has also been derived from BS 3G-173 'Specification for performance and interchangeability requirements for plugs and sockets for ground electrical supply to aircraft', issued by the British Standards Institution.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard covers dimensions of connections used to supply electrical power from a ground source to aircraft.

---

*Rules for rounding off numerical values (*revised*).

1.2 It also covers information on typical wiring diagrams for plugs and sockets.

2. TERMINOLOGY

2.0 For the purpose of this standard, the following definitions shall apply.

2.1 Aircraft Plug — The plug installed in an aircraft which accepts the electrical power supply via the ground supply socket from an external ground source.

2.2 Ground Supply Socket — The socket fitted to cables from the external ground source of electrical power which, when properly fitted to the aircraft plug, permits an electrical supply to be passed to the aircraft.

3. DIMENSIONS

3.1 The dimensions of 28 V, dc aircraft plug shall conform to Fig. 1.

3.2 The dimensions of 28 V, dc ground supply socket shall conform to Fig. 2.

3.3 The dimensions of 112 V, dc aircraft plug shall conform to Fig. 3.

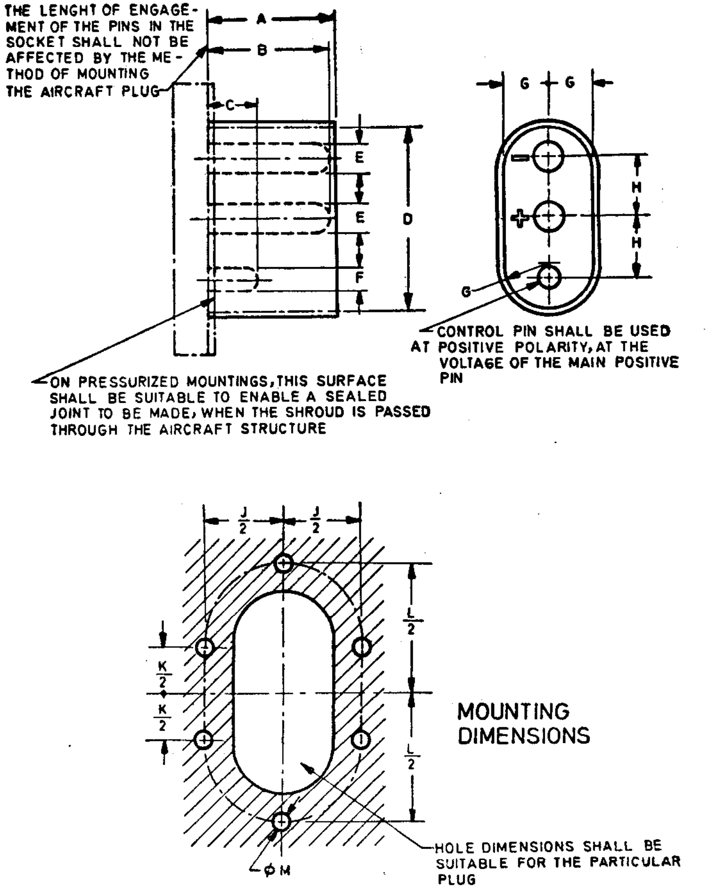
3.4 The dimensions of 112 V, dc ground supply socket shall conform to Fig. 4.

3.5 The dimensions of 115/200 V, 400 Hz, ac, three-phase aircraft plug shall conform to Fig. 5.

3.6 The dimensions of 115/200 V, 400 Hz, ac, three-phase ground supply socket shall conform to Fig. 6.

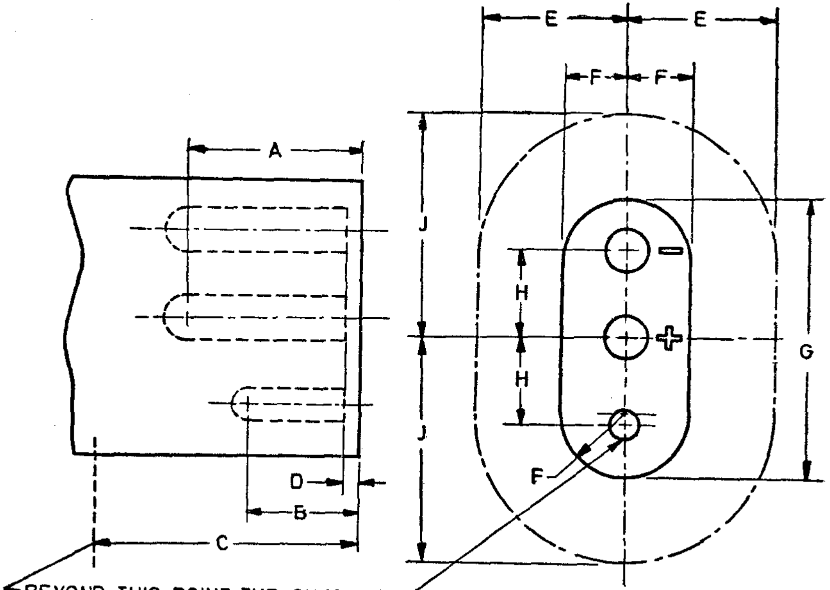
4. TYPICAL WIRING DIAGRAMS

4.1 Typical wiring diagrams for plugs and sockets are given in Appendix A.


THE LENGHT OF ENGAGEMENT OF THE PINS IN THE SOCKET SHALL NOT BE AFFECTED BY THE METHOD OF MOUNTING THE AIRCRAFT PLUG
A
B
C
E
E
D
F
G
G
H
H
G
CONTROL PIN SHALL BE USED AT POSITIVE POLARITY, AT THE VOLTAGE OF THE MAIN POSITIVE PIN
ON PRESSURIZED MOUNTINGS, THIS SURFACE SHALL BE SUITABLE TO ENABLE A SEALED JOINT TO BE MADE, WHEN THE SHROUD IS PASSED THROUGH THE AIRCRAFT STRUCTURE
J/2
J/2
L/2
L/2
K/2
K/2
MOUNTING DIMENSIONS
HOLE DIMENSIONS SHALL BE SUITABLE FOR THE PARTICULAR PLUG
ϕM

Dimension	mm	Dimension	mm
A	54 ± 0·8	*G*	19·43 ± 0·5
B	50·8 ± 0·4	*H*	25·4 ± 0·25
C	19·1 ± 0·4	*J*	56·7
D	$77{\cdot}77\,^{+1}_{-0}$	*K*	42·5
E	$11{\cdot}1\,^{0}_{-0{\cdot}05}$	*L*	98
F	$7{\cdot}92\,^{0}_{-0{\cdot}05}$	*M*	6·1

Fig. 1 Aircraft Plug, 28 V, DC



BEYOND THIS POINT, THE OVERALL DIMENSIONS SHALL NOT EXCEED THE ENVELOPE SHOWN BY THE LONG-CHAIN LINE IN THE PLAN VIEW

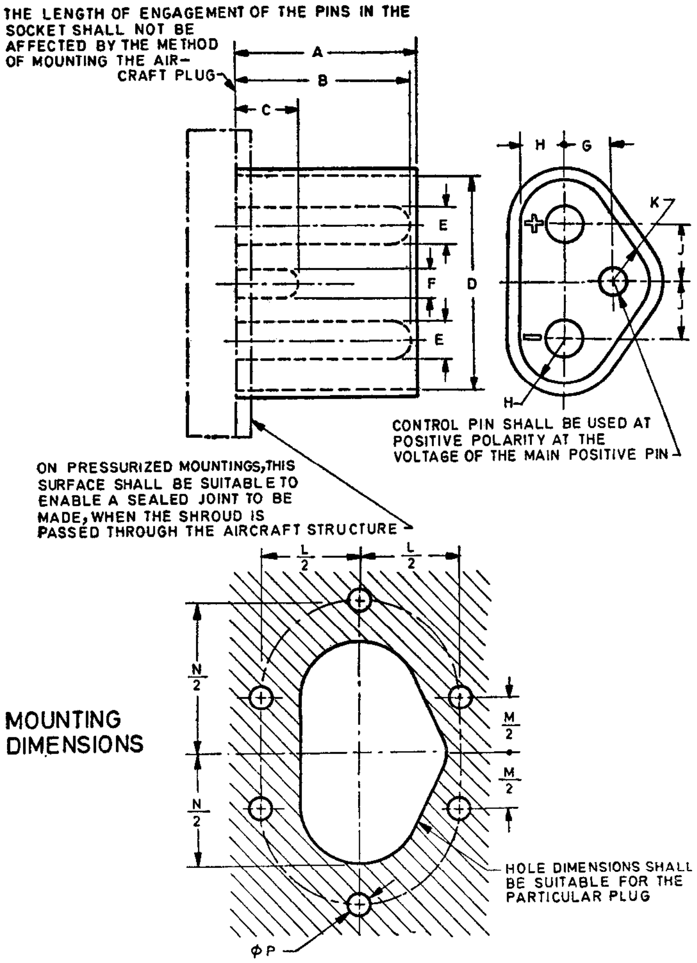
SPLIT SOCKET FOR THE CONTROL PIN SHALL BE USED AT POSITIVE POLARITY AT VOLTAGE OF THE SOCKET FOR THE MAIN POSITIVE PIN

Dimension	mm
A	51·6, *Min*
B	31·8, *Min*
**C*	63·5
D	3·2, *Max*
E	41·9
F	16·64 ± 0·25
G	$76{\cdot}2^{\ 0}_{-1{\cdot}6}$
H	25·4 ± 0·25
J	63·5

Note — Individual socket inserts shall have side play of ±0·5 mm. Fit of sockets for main pins shall be such as to limit the voltage drop at each main pin, measured between the cable connections of the ground supply socket and the aircraft plug, to 20 mV at 450 A.

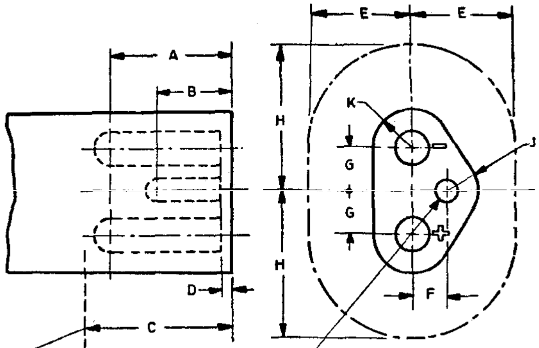
*Minimum length before any increase in cross section.

Fig. 2 Ground Supply Socket, 28 V, DC


THE LENGTH OF ENGAGEMENT OF THE PINS IN THE SOCKET SHALL NOT BE AFFECTED BY THE METHOD OF MOUNTING THE AIRCRAFT PLUG
A
B
C
E
F
D
E
H
G
K
J
J
H
CONTROL PIN SHALL BE USED AT POSITIVE POLARITY AT THE VOLTAGE OF THE MAIN POSITIVE PIN
ON PRESSURIZED MOUNTINGS, THIS SURFACE SHALL BE SUITABLE TO ENABLE A SEALED JOINT TO BE MADE, WHEN THE SHROUD IS PASSED THROUGH THE AIRCRAFT STRUCTURE
L/2
L/2
N/2
N/2
M/2
M/2
MOUNTING DIMENSIONS
HOLE DIMENSIONS SHALL BE SUITABLE FOR THE PARTICULAR PLUG
ϕP

Dimension	mm	Dimension	mm
A	54 ± 0·8	*H*	15·06 ± 0·5
B	50·8 ± 0·4	*J*	17·45 ± 0·25
C	19·1 ± 0·4	*K* (Radius)	10·31 ± 0·5
D	$65{\cdot}02^{+1}_{0}$	*L*	52·4
E	$11{\cdot}1^{0}_{-0{\cdot}05}$	*M*	38·1
F	$7{\cdot}925^{0}_{-0{\cdot}05}$	*N*	85·7
G	14·27 ± 0·5	*P*	6·1

Fig. 3 Aircraft Plug, 112 V, DC



BEYOND THIS POINT, THE OVERALL DIMENSIONS SHALL NOT EXCEED THE ENVELOPE SHOWN BY THE LONG-CHAIN LINE IN THE PLAN VIEW

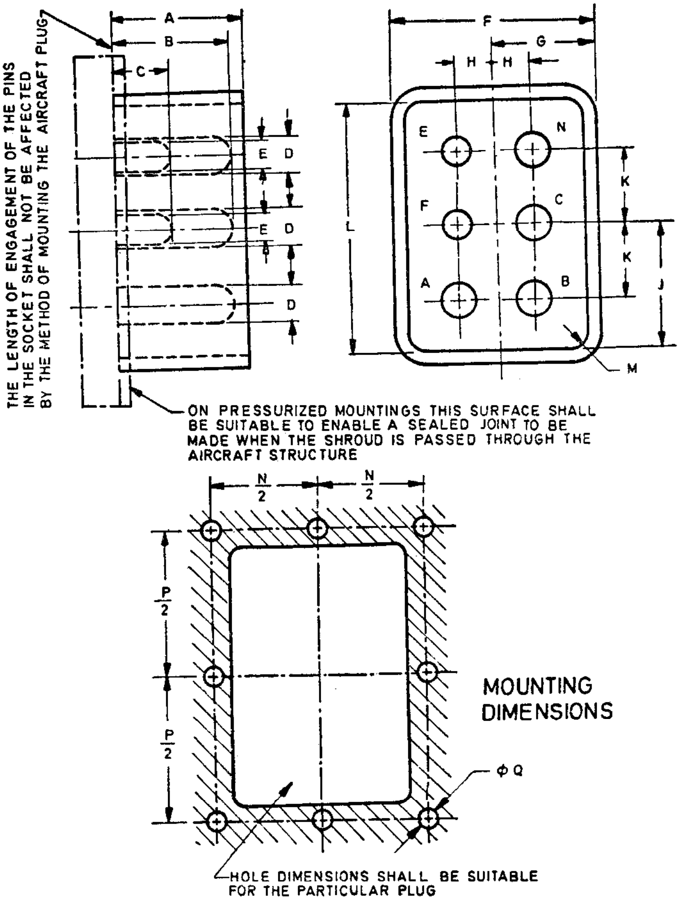
SPLIT SOCKET FOR THE CONTROL PIN SHALL BE USED AT POSITIVE POLARITY AT THE VOLTAGE OF THE SOCKET FOR THE MAIN POSITIVE PIN

Dimension	mm
A	51·6, *Min*
B	31·8, *Min*
**C*	63·5
D	3·2, *Max*
E	38·1
F	14·27 ± 0·25
G	17·45 ± 0·25
H	57·2
J (Radius)	9·53 ± 0·25
K (Radius)	14·57 ± 0·25

NOTE — Individual socket inserts shall have side play of ±0·5 mm. Fit of sockets for main pins shall be such as to limit the voltage drop at each main pin, measured between the cable connections of the ground supply socket and the aircraft plug, to 20 mV at 450 A.

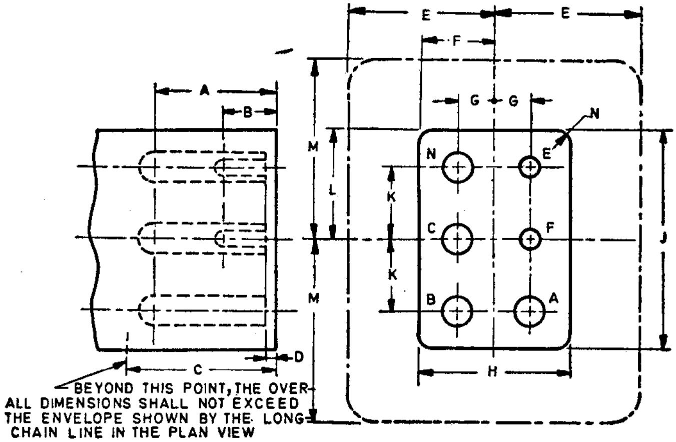
*Minimum length before any increase in cross section.

FIG. 4 GROUND SUPPLY SOCKET, 112 V, DC


THE LENGTH OF ENGAGEMENT OF THE PINS IN THE SOCKET SHALL NOT BE AFFECTED BY THE METHOD OF MOUNTING THE AIRCRAFT PLUG
A
B
C
E
D
E
D
D
F
G
H
H
E
N
F
C
A
B
K
K
L
J
M
ON PRESSURIZED MOUNTINGS THIS SURFACE SHALL BE SUITABLE TO ENABLE A SEALED JOINT TO BE MADE WHEN THE SHROUD IS PASSED THROUGH THE AIRCRAFT STRUCTURE
N/2
N/2
P/2
P/2
MOUNTING DIMENSIONS
ΦQ
HOLE DIMENSIONS SHALL BE SUITABLE FOR THE PARTICULAR PLUG

Dimension	mm	Dimension	mm
A	41·7 ± 0·8	*H*	12·7 ± 0·13
B	38·1 ± 0·4	*J*	41·9 $^{+0{\cdot}5}_{0}$
C	19·1 ± 0·4	*K*	25·4 ± 0·25
D	11·1 $^{0}_{-0{\cdot}05}$	*L*	83·8 $^{+1}_{0}$
E	7·925 $^{0}_{-0{\cdot}05}$	*M* (Radius)	3·8 ± 0·25
F	58·4 $^{+1}_{0}$	*N*	70
G	29·2 $^{+0{\cdot}51}_{0}$	*P*	95·3
		Q	6·5

FIG. 5 AIRCRAFT PLUG, AC, THREE-PHASE, 115/200 V, 400 Hz


E
E
F
G
G
N
A
B
M
L
K
K
M
N
E
C
F
B
A
J
H
C
D
BEYOND THIS POINT, THE OVERALL DIMENSIONS SHALL NOT EXCEED THE ENVELOPE SHOWN BY THE LONG CHAIN LINE IN THE PLAN VIEW

DIMENSION	mm
A	46·9, *Min*
B	20·6, *Min*
**C*	54
D	3·2, *Max*
E	54
F	28·58 ± 0·25
G	12·7 ± 0·13
H	57·2 ± 0·5
J	82·6 ± 0·5
K	25·4 ± 0·25
L	41·3 ± 0·25
M	66·7
N (Radius)	3·8 ± 0·25

NOTE — Individual socket inserts shall have side play of ±0·5 mm. Fit of sockets for main pins shall be such as to limit the voltage drop at each main pin, measured between the cable connections of the ground supply socket and the aircraft plug, to 20 mV at 450 A.

*Minimum length before any increase in cross section.

FIG. 6 GROUND SUPPLY SOCKET, AC, THREE-PHASE, 115/200 V, 400 Hz

APPENDIX A

(*Clause* 4.1)

TYPICAL WIRING DIAGRAMS FOR PLUGS AND SOCKETS

A-1. DC PLUGS AND SOCKETS

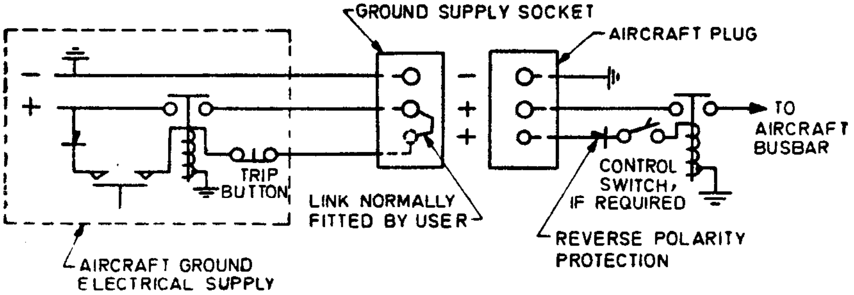
A-1.1 Typical wiring diagram for dc plugs and sockets is given in Fig. 7.

A-2. THREE-PHASE PLUGS AND SOCKETS

A-2.1 Typical wiring diagram for ac three-phase plugs and sockets is given in Fig. 8.

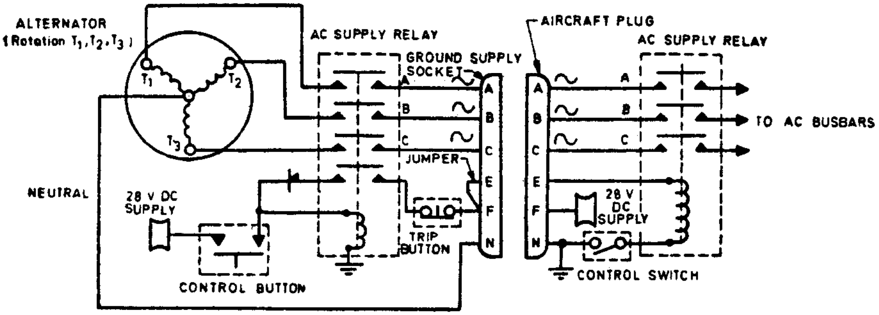
A-2.1.1 Typical ground supply socket wiring using aircraft power to actuate aircraft relay is given in Fig. 8A.

A-2.1.2 Typical ground supply socket wiring using external dc power to actuate aircraft relay is given in Fig. 8B.

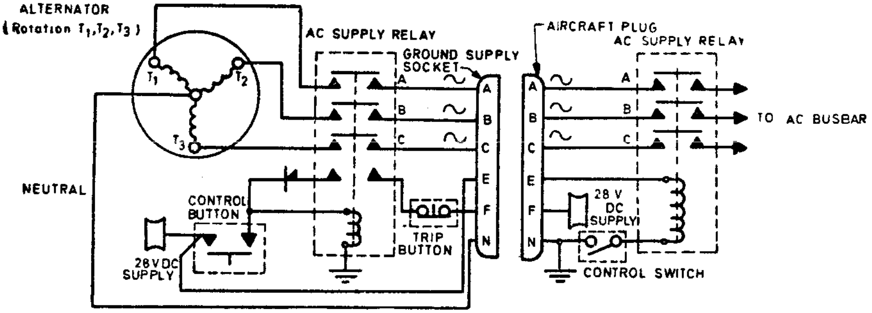

GROUND SUPPLY SOCKET
AIRCRAFT PLUG
−
+
−
+
+
TO AIRCRAFT BUSBAR
TRIP BUTTON
LINK NORMALLY FITTED BY USER
CONTROL SWITCH, IF REQUIRED
REVERSE POLARITY PROTECTION
AIRCRAFT GROUND ELECTRICAL SUPPLY

NOTE — It shall not be possible for the main pins or sockets to remain energized unless the control pins are engaged.

FIG. 7 TYPICAL WIRING FOR PLUGS AND SOCKETS, DC



8A Ground Supply Socket Wiring Using Aircraft Power to Actuate Aircraft Relay



8B. Ground Supply Socket Wiring Using External DC Power to Actuate Aircraft Relay

NOTE — It shall not be possible for the main pins or sockets to remain energized unless the control pins are engaged.

FIG. 8 TYPICAL WIRING DIAGRAMS FOR AC THREE-PHASE PLUGS AND SOCKETS

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IS:

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7856-1975	Safety features for ground power units for direct current aircraft-servicing and engine-starting
7857-1975	Aircraft-fuel nozzle grounding plugs and sockets
7915-1976	Dimensions for connections for aircraft ground electrical supplies

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